INTERFACE SPECIFICATION

FOR THE

DMSP TACTICAL TERMINALS

TO/FROM

AUTOMATED WEATHER DISTRIBUTION SYSTEM (AWDS)

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Prepared for:

Air Force Materiels Command, SPACE AND MISSILE SYSTEMS CENTER
AFMC/SMC/CIS
P.O. Box 92960
Los Angeles AFS CA 90009-2960

Prepared By:

AEROSPACE CORPORATION
DEFENSE METEOROLOGICAL SATELLITE PROGRAM

Authenticated By _____ Date 4 FEB 94
Space and Missile Systems Center

Approved By _____ Date 5 JAN 94
Electronic Systems Center

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1 .O SCOPE

1.1 Item Description

This interface specification defines the interface between the DMSP Tactical Weather Terminals and the colocated Automated Weather Distribution System (AWDS).

1 .1.1 MARK IV-B Tactical Weather Terminal Description.

The MARK IV-B Tactical Weather Terminal receives weather data directly and simultaneously from both geostationary and polar orbiting weather satellites . The system also receives weather inputs from other service sources . The system stores both raw weather images, refined weather data and product weather data . The user of the system uses these and other weather products in different combinations to produce new weather products . These new weather products are distributed to weather customers, like AWDS, by digital text or image on an event or scheduled basis.

The raster scan imagery will consist of geostationary visual, IR, and IR Water Vapor and Polar-Orbiter Visible, IR, and SSM/I imagery. The UGDF's consist of temperature, geopotential height, U & V wind, dewpoint temperature, cloud amount, cloud type, cloud tops, ice edge, ice age, rain rate, snow depth, soil moisture, surface wind speed, and tropopause height.

Vector graphics will consist of age maps, local analyses, and other products (ie. contours, isopleths).

1 .1.2 Small Tactical Terminal

The Small Tactical Terminal (STT) system is designed to provide multi-service tactical forces with a transportable meteorological data receiving and analysis capability, with direct data delivery to the field user without reliance on any land-line form of communication. It will provide mission planners and aircrews with real-time images and products of weather conditions in target areas. The STT will have two configurations: (1) a Basic system with the ability to receive the DMSP real time data smooth (RDS) signal, and (2) a Basic system with an enhancement kit that will allow the receipt of the real time data (RTD). The system will provide data and products to the AWDS and Combat Weather Systems when connected over an ethernet interface.

1 .1.3 AWDS Description

The AWDS is part of a global environmental support system which provides for the collection, processing, display, and dissemination of environment data to support the Department of Defense (DoD) . This system also supports the collection and dissemination of Notice to Airmen (NOTAM) messages pertaining to hazards to flight.

2.0 APPLICABLE DOCUMENTS

2.1 Government Documents

The following documents of the exact issue shown form a part of this specification to the extent specified herein . In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement.

2.1 .1 Specifications

SS-DMSP-907 11 July 1988	System Segment Specification for the MARK IV-B Fixed Site Tactical Weather Terminals Upgrade
OCR-AWDS-01-130 1 December 1988	Automated Weather Distribution System (AWDS) System Specification

2.1.2 Standards

MIL-STD-1777 August 12, 1983	Internet Protocol (IP)
MIL-STD-1778 August 12, 1983	Transport Control Protocol (TCP)

2.1.3 Drawings

- none -

2.1.4 Other Publications

FCM-S2-1990 May 1990	Standard Formats for Weather Data Exchange Among Automated Weather Information Systems (The Red Book)

2.2 Non-Government Documents

The following documents of the exact issue shown form a part of this specification to the extent specified herein . In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement.

2.2.1 Specifications

IEEE 802.3	Local Area Network CSMA/CD Access Method and Physical Layer Specification

2.2.2 Other Publications

Part 800-3805-10 System and Network Administration
Sun Microsystems
Rev A, 27 March 1990

3.0 INTERFACE REQUIREMENTS.

3.1 Physical

3.1.1 MARK IV-B.

The physical interface between the MARK IV-B Tactical Weather Terminal and the Local AWDS is accomplished at the user workstation area. This IEEE 802.3 compatible connection shall be between the 15 pin D-type termination of the **Auxillary Unit interface** (AUI) cable extending from the terminating fiber optic transceiver in the user workstation area and the collocated AWDS processor. The maximum transmission distance of the AUI cable shall be 50 meters. AWDS will provide power to the transceiver through the AUI cable (pin 13). See Figure 1.

3.1.2 Small Tactical Terminals

The Small Tactical Terminal shall provide an interface at the STT workstation. This interface shall be a 15 pin AUI connector. The maximum transmission distance of the AUI cable shall be 50 meters.
See Figure 2.

3.2 Functional

The Local AWDS interface with the DMSP Tactical Weather Terminals transfers data one way. The DMSP Tactical Weather Terminals transmit data to the AWDS, but does not receive any data from AWDS.

3.2.1 Electronic

The electronic interface between the DMSP Tactical Weather Terminal and the Local AWDS shall comply with an IEEE 802.3 (Ethernet) interface.

3.2.2 Electrical

Not Applicable.

3.2.3 Hydraulic and Pneumatic

Not Applicable.

3.2.4 Software Functional Interface

The following sections describe the software functional interface between the DMSP Tactical Weather Terminals and the Local AWDS. This software interface is compatible with OCR-AWDS-01-130. The AWDS interface with the DMSP Tactical Weather Terminal transfers data one way. There are three categories of products which are transferred from the DMSP Tactical Terminals to the AWDS station(s). These products are transferred over the interface in formats described in this section. The product types supported by the formats in this section are:

a. Uniform Gridded Data Fields Products.

b. Vector Graphic Products (Mark IVB only).

c. Raster Scan Products.

3.2.4.1 Product Message Format

The product format to be transmitted to the AWDS shall be in accordance with OCR-AWDS-01-130 Product Data Set Structure and Block Formats, Appendix. 30. The product data set may contain multiple information blocks as required to define fully the product being transferred. The general structure is shown in Figure 3. These blocks are categorized as product definition, data description, and control blocks.

a. Product Identification Block. This is a mandatory block used to convey the information needed to identify uniquely each product so that appropriate processing routines may be initiated within the AWDS.

b. Product Definition Block. This block contains information required to define the nature of the product being transferred.

c. Data Description Block. This block contains all information required to describe the contents of the data block(s) that follow.

d. Data Block. This block contains the product data in the format specified by the data description block.

e. End of Product Block. This is a mandatory block used to signify the end of the product data set.

3.2.4.2 Uniform Gridded Data Field Products

Uniform Gridded Data Field (UGDF) products consist of single element sets corresponding to locations on a uniformly spaced grid.

The only exception to this is geostrophic winds, which will be a multiple element set, sent under PID identifier first E character 9, with UWC and VWC mnemonics identified in the data description block (mode 3, submode 21).

Missing data within the grid shall be identified by all bits set to one in the data block for each missing grid point.

UGDF fields are shipped in the following sequence:

1. UGDF Product Identification Block (mode 1, submode 1)
2. Gridded Data Product Definition Block (mode 7, submode 20)
3. Unpacked UGDF Data Description Block (mode 3, submode 21)
4. Unpacked UGDF Data Block (mode 3, submode 1)
5. End of product block (mode 1, submode 2)

3.2.4.2.1 UGDF Product identification Block

The product identification block shall be formatted as shown in Figure 4. The block elements are defined in FCM-S2-1990 Section 4.1, and consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b. Length: (14-bits) set to 16 (octal). Indicating the number of byte pairs in the current block.

c. Mode: (8-bits) set to 1 (octal).

d. Submode: (8-bits) set to 1 (octal).

e. Originator Identification: Set to the ICAO code designated in site set-up.

f. Classification: set to a single ASCII character “U”, for unclassified.

g. Retention Time: Not used; set to binary zero.

h. Product Identifier: The Product Identifier is represented by a ten character set, "FDTTAA(ii)EE". It is set as follows:

(1) F - File Indicator: Set to ASCII “E” for the DMSP tactical systems.

(2) D is set to ASCII:
'Y' for eighth mesh UGDF

(3) TT is set to ASCII:
‘AN’ for UGDF products.

(4) AA is set to ASCII per information in Table I. AA identifies the area coverage of the product.

(5) (ii)EE is set per Table II

i. Product File Time: The Product File Time shall consist of a full century year (16 bit integer), month, day, hour, and minute (8 bit integers). It represents a means of further identifying products with identical Product Identifiers. This time shall

be the date/time the product was generated for transmission to AWDS.

j. Checksum: The Checksum is a two's complement 16 bit field containing the arithmetic sum of all the byte pairs with no end around carry. Adding all the byte pairs in a Mode/Submode that contains a Checksum field will produce a sum equal to zero.

3.2.4.2.2 UGDF Product Definition Block

The product definition block shall be formatted as shown in Figure 5. The block elements consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b. Length: (14-bits) set to 30 (octal) representing the number of byte pairs in the current block.

c. Mode: (8-bits) set to 7 (octal).

d. Submode: (8-bits) set to 20 (octal).

e. Projection indicator (PI) Set: (8-bits) Set to the PI set defined in the Product List by the user.

f. Grid Indicator (GI) Set: (&bits) Set to: 0 (Not used by AWDS)

g. Scale Factor (16-bits): Not used; set to binary zero.

h. Coordinate Flag: (8-bits) Set to one (1) to indicate that the coordinate system used in the gridded product is the Air Force Global Weather Central (AFGWC) Satellite Global Data Base (SGDB) grid system. The grid point numbers (indices) sent in the product depend on the SGDB grid mesh for the product. The GI set code is not used by AWDS.

i. Units Code: (8-bits) set in accordance with Table Ill.

j. Scale Exponent: (8-bits) Not used; set to binary zero.

k. Multiplier Constant: (8-bits) Not used; set to binary zero.

l. First Band Index Value (BI): (16-bits) Not used; set to binary zero.

m. First Delta BI Values: (16-bits) Not used; set to binary zero.

n. Number of Columns and Number of Rows: (16-bits each)

(1) Set Number of Columns equal to array size width (129 for regional eighth mesh).

(2) Set Number of Rows equal to array size length (129 for regional eighth mesh).

o. Reference Coordinates: (16-bits each) The reference coordinates specify the first grid point for which data are transmitted, in SGDB coordinates for the grid mesh specified by the UGDF product request. These coordinates will be for the lower left corner of the product. (Eighth mesh I, J values)

p ISTART/JSTART: ISTART and JSTART shall be set to zero. These values are not used by AWDS.

q Month, Day, Hour, and Minute: (8-bits each) Two sets are given. The first will contain the valid time of the most recent data (acquisition time) used to generate the product. The second set will be set to zero to indicate that the field is an analysis field.

r IPOLE/JPOLE: (16-bits each) For Polar Stereographic projections, the IPOLE/JPOLE fields define the horizontal and vertical SGDB eighth mesh grid indices, respectively, from the pole to the lower left corner of the product.

For Mercator projections, the IPOLE defines the East-West SGDB eighth mesh grid index from the Greenwich meridian to the meridian that passes through the lower left corner of the product, and the JPOLE defines the North-South SGDB indices from the equator to the bottom of the product.

IPOLE = (Ip - REFERENCE I COORDINATE), and

JPOLE = (REFERENCE J COORDINATE - J_p),

where :

1) for Polar Stereographic projections, Ip and Jp are the SGDB coordinates for the pole (North,South) in the SGDB grid mesh indices.

2) for Mercator projection, Ip and Jp are the SGDB coordinates of the intersection of the Greenwich meridian and the equator in the SGDB grid mesh indices.

For both Polar Stereographic and Mercator projections, the IPOLE/JPOLE grid distances are the number of SGDB grid mesh intervals. DMSP Tactical Weather Terminals will use eighth mesh grid intervals.

s. RE/D: (16-bits) Not used; set to binary zero.

t. Longitude X: (16-bits) Longitude X is the longitude of the meridian perpendicular to the base of the product and extending from the base of the product to the pole. Longitude X may be outside of the product boundaries. Valid Longitude X integers follow:

Longitude X	Integer Value
10E	10
100E	100
190E (170 W)	-170
280E (80 W)	-80

Longitude X will be set to zero for Mercator projections.

u. Reference Code: (8-bits) Set to '2' (two), to indicate that the reference Coordinates for the product represent the lower left corner of the product in SGDB grid mesh indices.

v. Scan Code: (8-bits) Set to '2' (two), to indicate that the order in which the data for the grid points appears in the data block(s) will be left to right, row by row, bottom up, with respect to the orientation of the product.

w. Checksum: See 3.2.4.2.1 .j.

3.2.4.2.3 UGDF Data Description Block.

The data description block shall be formatted as shown in Figure 6. The block elements consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b. Length: (14-bits) set to the number of byte pairs in the current block.

C. Mode: (8-bits) set to 3 (octal).

d. Submode: (8-bits) set to 21 (octal).

e. Elements Per Element Set: (8-bits) set to one (1) for all products except for geostrophic winds where it shall be set to two (2).

f. Bytes Per Element Set: (8-bits) set to two (2) for all products except for geostrophic winds where it shall be set to four (4).

g. Number of Element Sets: (16-bits) set to a value equal to the value of (Number of Rows) • (Number of Columns). For eighth mesh field, this will be 129 x 129.

h. Element Mnemonic Characters: (8-bits each) set in accordance with Table IV. The Mnemonic may not fill the four character mnemonic field; if not, the first character of the mnemonic will be in the first character field, and the unused fields will be set to ASCII 'space'.

i. Start Byte of Element: (8-bits) set to four for the first element, and set to six for the second element of the geostrophic winds.

j. Bytes Occupied Per Element: (8-bits) set to two (2).

k. Unused: Not used; (8 -bits) set to binary zero.

l. Units Code: (8-bits). Set in accordance with Table IV.

m. Multiplier Mantissa: (8-bits) set in accordance with Table IV.

n. Multiplier Characteristic: (8-bits) set in accordance with Table IV.

o. Additive Constant: (16-bits) set in accordance with Table IV.

p. Repeat h-o for second element of geostrophic winds.

q. Checksum: See 3.2.4.2.1 .j.

3.2.4.2.4 UGDF Data Block

The data block shall be formatted as shown in Figure 7. The block elements are defined in FCM-S2-1990, Section 10.3.1 and consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b. Length: (14-bits) set to the number of byte pairs in the current block.

c. Mode: (8-bits) set to 3 (octal).

d. Submode: (8-bits) set to 1 (octal).

e. Elements: Contains the data values of each element set for the product being transmitted in sequence as defined in the scan code from the lower left hand corner.

f. Checksum: See 3.2.4.2.1 .j.

3.2.4.2.5 UGDF End of Product Block

The end of product block shall be formatted as shown in Figure 8. The block elements are defined in FCM-S2-1990 Section 4.2, and consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b. Length: (14-bits) set to 3 (integer).

c. Mode: (8-bits) set to 1 (octal).

d. Submode: (8-bits) set to 2 (octal).

e. Checksum: (16-bits) set to 177373 (octal).

3.2.4.3 Vector Graphic Products

Vector graphic products are representative of maps, charts, and figures. As such, they contain a wide variety of data, such as lines defined by strings of vectors, A/N data to be plotted at a given location, weather symbols, legends, etc. A Logical Reference Display Space is used to define the area of the product and is coregistered to the PI sets. The Logical Reference Display space shall be 1024 x 1024 (values from 0 to 1023) with clipping performed on the DMSP tactical systems. To transfer these products, it is necessary to provide a number of different mode/submode blocks. These blocks may be arranged in any order, so long as the blocking conventions are not violated. The general sequence is:

1. Product Identification Block (Mode 01 Submode 01)
2. Vector Graphic Product Definition Block (Mode 04 Submode 20)
3. Define Plot Parameters Block (Mode 01 Submode 04)
4. Absolute Vectors Block (Mode 04, Submode 01)
5. Alphanumeric Characters Block (Mode 05, submode 01)
6. Data Plot Block (Mode 05, submode 02)
7. Wind Barb Data block (option) (Mode 05 submode 03)
8. End of Product Block (Mode 01 ,submode 02)

3.2.4.3.1 Vector Graphic Product Identification Block

The Product identification Block shall be formatted as shown in Figure 4. The block elements are defined in FCM-S2-1990 Section 4.1, and consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b. Length: (14-bits) set to the number of byte pairs in the current block.

c. Mode: (8-bits) set to 1 (octal).

d. Submode: (8-bits) set to 1 (octal).

e. Originator Identification: (8-bits each) set to ICAO site code at system set-up.

f. Classification: (8-bits) set to a single ASCII character "U", for unclassified.

g. Retention Time: (8-bits) Not used; set to all zeros.

h. Product Identifier: (8-bits each field) The Product Identifier is represented by a ten character set, "FDTTAA(ii)EE". It is set as follows:

(1) F - File Indicator; Set to ASCII "E" for the DMSP tactical systems.

(2) D is set to ASCII ‘V’ for Vector graphics,

(3) TT is set to ASCII;

AX for age map transmissions
AN for all other vector products

(4) AA is set to ASCII: see Table I. AA identifies the area coverage of the product.

(5) (ii)EE - is set per Table II.

i. Product File Time: The Product File Time shall consist of a full century year (16 bit integer), month, day, hour, and minute (8 bit integers). It represents a means of further identifying products with identical Product Identifiers. Unless otherwise specified, this time shall be the date/time the product was generated.

j. Checksum: See 3.2.4.2.1 .j.

3.2.4.3.2 Vector Graphic Product Definition Block

The definition block shall be formatted as shown in Figure 9. The block elements are defined in FCM-S2-1990 Section 7.1 .1, and consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b. Length: (14-bits) set to the number of byte pairs in the current block.

c. Mode: (8-bits) set to 4 (octal).

d. Submode: (8-bits) set to 20 (octal).

e. Projection Indicator Set: (8-bits) Set to an user selected projection in the product list.

f. Coordinate Flag: (8-bits) set to two (2) (octal) to indicate that the coordinate system used in the vector graphic product is Logical Display reference (I/J).

g. Scale Factor: (16-bits) Not used; set to zero.

h. Area Code: (8-bits) set to '034' (octal) to indicate that Reference Points 1 and 2 define the lower left and upper right corners respectively, of the product with respect to the origin the product would have if viewed on a display screen, and Reference Point 3 defines the upper right corner of the Display Device.

i. Label Code: (8-bits) set to '0' (zero).

j. Reference Points: (16-bits each) These three reference points uniquely define the boundary and orientation of the product. Reference point one (1) defines the lower left corner of the product, and reference point two (2) defines the upper right corner, with respect to the orientation the product would have if viewed on a display screen. These first two points will be integers and will be in

AFGWC whole mesh SGDB grid indices. The lower left corner of the product is coincident with Logical Display reference point (0,0). The third set of reference points (Reference point 3) is the coordinate of the upper right corner of the Logical Display space. This point is coincident with reference point 2. The ratio of Reference I Point 3 to Reference J Point 3 is the aspect ratio of the displayed product. All corner reference points are relative to the product as the product would appear to an user when the product is displayed on a display screen. That is, the lower left corner of the product would be at the lower left corner of the display screen. The Horizontal (I-direction) and Vertical (J-direction) are with respect to the product viewed on the display screen.

k. Month, Day, Hour, and Minute: (8-bits each) Two sets are given. The first will contain the valid time of the most recent data used to generate the product. The second set will be set to zeroes to indicate an analysis product.

(1.) Checksum: See 3.2.4.2.1 .j.

3.2.4.3.3 Define Plot Parameters Block

Define Plot Parameters Block Mode 1 Submode 04. This block should be formatted per Figure 10.

a. Flag bits (2 bits): set to 0 (octal).

b. Length (14 bits): set to the number of byte pairs in the block.

c. Zoom Threshold (8 bits): set to zero by DMSP tactical terminals and not used by AWDS.

d. Zoom Factor (8 bits): set to zero by DMSP tactical terminals (display at all zoom levels).

e. Plot Color (8 bits): value set to line color (0 to 255) by DMSP tactical terminals. AWDS will ignore this byte.

f. Background Color (8 bits): value set to background color (0 to 255) by DMSP tactical terminals. AWDS will ignore this byte.

g. Line Character (8 bits): value set to line type. DMSP tactical terminals will set this character to 5 and use AWDS symbolic line codes. AWDS will ignore this character.
0 = Continuous
1= Dotted Line (alternate pixels)
2 = Dashed line (short dashes)
3 =-Dashed line (long dashes)
4 = Dotted line (every 4th pixel)
5 = Symbolic line

h. Line Width (8 bits): AWDS shall ignore this byte. DMSP tactical terminals shall

set this byte to zero.

i. Line Style Mnemonic (32 bits): Characters are the symbolic line style mnemonic as specified in Table V. This element indicates the type of symbolic line defined in the vector blocks that follow.

j. Checksum (16 bits): See 3.2.4.2.1 .j.

3.2.4 Vector Graphic Data Blocks

There are five data block types associated with the Vector Graphic product.

a. tong/Short Relative Vectors Block (not used by DMSP tactical systems).

b. Absolute Vectors Block.

c. Alphanumeric Character Block.

d. Plot Data Block.

e. Wind Barb Data Block (optional).

3.2.4.3.4.1 Absolute Vectors Block

This block is used to transmit coordinates of the vector end points that define one line on the product. This data block shall be formatted as shown in Figure 11. The block elements consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b. Length: (14-bits) set to the number of byte pairs in the current block.

c. Mode: (8-bits) set to 4 (octal).

d. Submode: (8 - bits) set to 1 (octal).

e. Coordinates: set as described in Figure 11.

f. Beam Flag: set as described in Figure 11.

g. Checksum: See 3.2.4.2.1 .j.

3.2.4.3.4.2 Alphanumeric Characters Block

This block is used to transmit textual information to be placed on the displayed product. This data block shall be formatted as shown in Figure 12. The block elements consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b. Length: (14-bits) set to the number of byte pairs in the current block.

c. Mode: (g-bits) set to 5 (octal).

d. Submode: (g-bits) set to 1 (octal)

e. Coordinates: defines the location of the lower left corner of the first character of the string. This location will be in Logical Display reference index.

f. Delta I,J: The Delta I and Delta J identify the start point at some desired distance from the I and J coordinate element in units of Logical Display reference interval.

g. Blanking Flag (B): An indicator specifying blanking of the area covered by a character font. One (1) means background not displayed, zero (0) means background is displayed. DMSP Tactical Weather Terminals shall set this bit to zero.

h. Reverse Video Flag: An indicator specifying how characters 1 through N are to be displayed. One (1) means reverse image, and zero (0) means normal image. DMSP Tactical Weather Terminals shall this bit to zero.

i. Character Size: Defines the display dimensions of a character/symbol as a multiplicative factor of the font size normally used to describe the character/symbol. A value greater than zero represents a multiplicative factor used to increase the normal character/symbol by pixel replication; e.g., if the normal size of a character/symbol is 5 by 7 pixels, a value of (1) represents 10 by 14 pixels, (2) represents 15 by 21, etc. DMSP tactical terminals shall set this bit to 0 or 1 depending upon the user creation of the product. A maximum number of 120 characters shall be used.

j. Characters 1 through N: The alphanumeric text information.

k. Checksum: See 3.2.4.2.1 .j.

This block is used to transmit non-standard product labels and legends or variable information to be placed in a standard label or legend. The product title shall be always sent as the last alphanumeric character block.
The contents of this title shall be:

First Field - Source of data: DMSP terminal (Mark IVB)
Second Field - Region identification per Table I
Third Field - Description (30 characters)
Fourth Field - Valid Time - dd/hhmmZ
(Age map may need a geo/polar identification in description field).

3.2.4.3.4.3 Plot Data Block

This block is used to transmit ASCII characters or meteorological symbols to be displayed at a specified location on the product. This data block shall be formatted as shown in Figure 13. The block elements consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b. Length: (14-bits) set to the number of bytes pairs in the current block.

c. Mode: (8-bits) set to 5 (octal).

d. Submode: (8-bits) set to 2 (octal).

e. Blanking Flag (B) (1 bit) An indicator specifying blanking of the area covered by a character font. One (1) means background not displayed, zero (0) means background is displayed. The background flag shall be set to zero by DMSP Tactical Weather Terminals.

f. Reverse Video Flag (R) (1 bit) An indicator specifying how many characters 1 through N are to be displayed. One (1) means reverse image, and zero (0) means normal image. Reverse video flag shall be set to zero by the DMSP Tactical Weather Terminals.

g. Character Size: (6-bits) Defines the display dimensions of a character/symbol as a multiplicative factor of the font size normally used to describe the character/symbol. A value greater than zero represents a multiplicative factor used to increase the normal character/symbol by pixel replication; e.g., if the normal size of a character/symbol is 5 by 7 pixels, a value of (1) represents 10 by 14 pixels, (2) represents 15 by 21, etc. DMSP Tactical Weather Terminals shall set the character size according to the user selection while drawing the original product.

h. Plot Process Code: (8-bits) This octal code specifies the processing required to interpret and display the data in the block. Currently the codes are:

0 - The data within the block represents alphanumeric characters to be displayed as a label associated with a line drawn by a series of vectors. The label is to be placed with the lower left corner of the first character at the location specified by the I and J coordinates. There shall only be one coordinate pair and one set of alphanumeric characters in the data plot block.

1 - The data within the block is to be interpreted as mnemonics for symbols to be displayed on the product. Each symbol is to be placed with the lower left corner of the symbol at the location specified by the I and J coordinates. Each mnemonic will be four ASCII characters in length and the data block can contain any number of coordinate pairs and mnemonics up to 511. The vector graphic mnemonics and the symbols to which the mnemonics relate are shown in Table V. The first character shall be non blank.

i. I and J Coordinates: (16-bits each) Defines the location where the data is to be plotted as detailed above. This point will be in I/J Logical Display reference index.

j. Characters: (8-bits each) The ASCII character string representing the alphanumeric character label or symbol mnemonic that is defined by the Plot Process Code. The Mnemonic may not fill the four character mnemonic field; if not, the first character of the mnemonic will be in the first character field, and the unused fields will be set to ASCII 'space'.

k. Checksum: See 3.2.4.2.1 .j.

3.2.4.3.4.4 Wind Barb Data Block (optional)

This data block allows the plotting of wind barbs on a graphics display. The block should be formatted per Figure 14. If this field is used, the DMSP tactical terminals shall set the fields as follows:

a. Flag (2 bits): set to 0 (Octal).

b. Length (14 bits): set to the number of byte pairs in the wind barb data block.

c. Mode (8 bits): set to 005 (Octal).

d. Submode (8 bits): set to 003 (Octal).

e. Shaft Length (8 bits): set to zero (not used by DMSP Tactical Weather Terminals or AWDS).

f. Blanking Flag (8 bits): set to 000 (Octal). DMSP Tactical Weather Terminals shall send the wind barbs to be plotted with the background displayed.

g. I coordinate (16 bits): The I position in reference display space where the wind barb is to be plotted. The value can range from 0 to 511.

h. J coordinate (16 bits): The J position in reference display space where the wind barb is to be plotted. The value can range from 0 to 511.

i. Direction (16 bits): An integer number in whole degrees. It specifies the direction from which the wind is blowing.

j. Speed (16 bits): An integer number in whole knots.

k. Gust (8 bits): An integer number in whole knots.

l. Hemisphere (8 bits): An integer indicating the Hemisphere. 0 = Southern Hemisphere, the wind flags go to the clockwise side of the shaft. 1 = Northern

Hemisphere, the wind flags go to the counter clockwise side of the shaft.

m Checksum (16 bits): See 3.2.4.2.1 .j.

3.2.4.3.5 Vector Graphic End of Product Block

The end of product block shall be formatted as shown in Figure 8. The block elements consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b. Length: (14-bits) set to 3 (integer).

c. Mode: (8-bits) set to 1 (octal).

d. Submode: (8-bits) set to 2 (octal).

e. Checksum: set to 177373 (octal).

3.2.4.4 Raster Scan Products

The Raster Scan products are picture element (pixel) data making up imagery such as satellite pictures, graphic pictures, or facsimile type products. The DMSP Tactical Weather Terminals shall extract the raster products from its projected bases, perform conversions (rotation, grayscale remapping, geometric extraction) and ship the data to AWDS in a 1024 x 1024 image version. The sequence of blocks shall be:

1. Product Identification Block (Mode 01 submode 01)
2. Satellite Product Definition Bock (Mode 06 submode 20)
3. Pixel Product Definition Block (Mode 06 submode 30)
4. Define Datawidth Block (Mode 01 submode 05)
5. Raster Scan Data Block (Mode 06 submode 01)
6. End of Product Block (Mode 01 sub mode 02)

3.a.J.4.1 Raster Scan Product Identification Block

The product identification block shall be formatted as shown in Figure 4. The block elements consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b Length: (14-bits) set to the number of byte pairs in the current block including the length and checksum.

c. Mode: (8-bits) set to 1 (octal).

d. Submode: (8-bits) set to 1 (octal).

e. Originator Identification: (8-bits each char) set to ICAO code as defined at site

set-up.

f. Classification: (8-bits) set to a single ASCII character "U", for unclassified.

g. Retention Time: (8-bits) Not used; set to all zeros.

h. Product Identifier: (8-bits each) The Product Identifier is represented by a ten character set, "FDTTAA(ii)EE". It is set as follows:

(1) F - File Indicator: Set to ASCII "E" for the DMSP tactical terminals.

(2) D is set to ASCII:
'S' for Satellite Products.

(3) TT is set to ASCII:
'TI' for satellite products,

(4) AA is set to ASCII per Table I: AA identifies the area coverage of the product.

(5) (ii)EE is set to four blanks (ASCII blank filled).

i. Product File Time: (8-bits each) The Product File Time shall consist of a full century year (16 bit integer), month, day, hour, and minute (8 bit integers). It represents a means of further identifying products with identical Product Identifiers. This time shall be the date/time the product was generated.

j. Checksum: See 3.2.4.2.1 .j.

3.2.4.4.2 Raster Scan Product Definition Blocks

The Definition Blocks listed in this section will be used to define the Raster Scan Product that is to be sent. A combination of several of these Definition Blocks may be needed to fully define the product.

3.2.4.4.2.1 Satellite Product Definition Block

This block is used to define all projected Raster Scan products that are in the form of imagery; i.e., satellite data as opposed to facsimile products. This data block shall be formatted as shown in Figure 15. The block elements consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b. Length: (W-bits) set to the number of byte pairs in the current block including length and checksum in the current product identification block.

c. Mode: (8-bits) set to 6 (octal).

d. Submode: (8-bits) set to 20 (octal).

e. Projection Indicator Set: (8-bits each) The DMSP tactical terminals shall use the PI set code identified by the user in the product list.

f. Grid indicator (GI) Set: (g-bits) Not used by AWDS; set to zero.

g. Satellite Identification: (8-bits each) Two ASCII characters that identify the satellite from which the product was produced. The first character indicates the agency or country the satellite belongs to and the second dictates the satellite within the agency or country. If it is a merged data set, this field shall identify the most recent source of satellite information. These two characters may be sent in this definition block but they are not currently used by AWDS. Currently defined identifications are:

FIRST CHARACTER:

A - U.S. Air Force
C - China
E - Europe
I - India
J - Japan
N - NOAA
R - Russia
S - NASA
V - U.S. Navy

SECOND CHARACTER: - None Currently Defined

h. Longitude X: (16-bits) Longitude X is the longitude of the meridian perpendicular to the base of the product and extending from the base of the product to the pole. Longitude X may be outside of the product boundaries. Valid Longitude X integer values are:

Longitude X	Inteaer Value
10E	10
100E	100
190E (170W)	-170
280E (80W)	-80

i. Resolution Code: (8-bits) This element specifies the resolution of the satellite data in the product in tenths of nautical miles, i.e., the resolution code must be multiplied by (.1) to obtain the actual value. The DMSP tactical terminals will use the nominal sampling distance for the PI set of al 024 x 1024 image.

j. Data Type: (8-bits) An integer code that specifies the type of satellite data contained in the product. The currently defined codes are:

0 = visible (VIS)
1 = Infrared (IR)
6 = reserved for microwave

k. IMAX and JMAX: (16-bits each) The maximum horizontal (IMAX) and vertical (JMAX) size of the product in pixels. IMAX will be 1024 and JMAX will be 1024 for a 1024 x 1024 image.

l. Enhancement Data: (&bits each) These elements are not used for AWDS products. Set the following elements to zero filled:

(a) Enhance Max.

(b) Enhance Min.

(c) Enhance Id.

m. Length: (8-bits) These elements is not used for AWDS products; set to zero.

n. I-Center: Not used; set to zero.

0. J-Center: Not used; set to zero.

p. Latitude: Not used; set to zero.

q. Longitude: Not used; set to zero.

r. Number of Characters: set to the number of characters contained in the product title that follows. A maximum of 72 characters will be used.

s. Characters: The ASCII characters that make up the product title as defined by the user in the product definition.
First Field shall be Source of data: DMSP tactical terminal (STT, Mark IVB)
Second Field - Region legend per Table I
Third Field - Satellite (POL, GEO)
Fourth Field - Five character field:

VIS visible	0.4-1.1 µm	DMSP
	0.58-0.68 µm	NOAA
NIR near infrared	0.7 - 1 .1µm	NOAA
WV water vapor	6.5 µm	GOES/METEOSAT
LC low cloud	3.5-3.9 µm	NOAA]
IR infra-red	10.3-l 2.5 µm	DMSP
	10.3-l 1.3 µm	NOAA
	11.5-l 2.5 µm	NOAA
SC snow cloud	1.6-l .7 µm	NOAA

Fifth Field - Valid Time (dd/hhmmZ) (dd = day of month) (Aquisition Time)
Sixth Field - Satellite ID (F-l 1, NOAA-l 0, etc) and ascending node time.

t. Checksum: see paragraph 3.2.4.2.1 .j.

3.2.4.4.2.2 Pixel Product Definition Block

3.2.4.4.2.2 Pixel Product Definition Block

This block is used to define the orientation and projection of the product. The PI set code shall be the same as used in the satellite identification block. The format for the block is shown in Figure 16.

a. Flag bit: DMSP tactical terminals shall set the two bits to zero.

b. Length(i): DMSP tactical terminals shall set this to 5.

c Mode: DMSP tactical terminals shall set this to 006 (octal).

Submode: DMSP tactical terminals shall set this to 030 (octal).

e PI Set: Must be the same as the identification used in the satellite identification block.

Matrix Code: An octal code defining the dimensions of the pixel array being sent in the product. The DMSP tactical terminals shall use:

20 (octal) 1024 x 1024 x 8

g Scan Code: used to indicate the order in which the raster scan pixels are arranged in the data block. The scan code used by the DMSP tactical terminals shall be:

2 - Data are arranged in the data block such that pixels are defined row by row irom the lower left corner.

n. Pack Code: A code defining the algorithm used to pack the product. The DMSP tactical terminals shall use a code value of 2 octal and send a Datawidth/Fieldwidth block (Figure 17).

3.2.4.4.2.3 Define Datawidth Fieldwidth Block

This data block will be used to redefine number of bits per pixel, and the number of bits in the field containing that pixel, in the block for Raster Scan products. This data block shall be formatted as shown in Figure 17. The block elements consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b. Length: (14-bits) set to the number of byte pairs in the current block.

c. Mode: (8-bits) set to 1 (octal).

d. Submode: (8-bits) set to 5 (octal).

e. Fieldwidth: An integer number that defines the number of bits allocated to each data element in the specified mode/submode. The fieldwidth will be set to 8 for

imagery.

f. Datawidth: An integer number that defines the number of bits used by the actual data within the fieldwidth. The datawidth shall be set to 8.

g. Affected Mode: This mode shall be set for mode 6.

h. Affected Submode: The submode shall be set to 1.

i. Checksum: See 3.2.4.2.1 .j.

3.2.4.4.3 Raster Scan Data Block

This data block shall be formatted as shown in Figure 18. The block elements consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b. Length: (14-bits) set to the number of byte pairs in the current block. There shall be a maximum length of 2048 byte pairs per block.

C. Mode: (8-bits) set to 6 (octal).

d. Submode: (8-bits) set to 1 (octal).

e. Starting Location (IROW and ICOL): (16-bits each) The row and column number, within the product, where the first pixel in the data block is located. For example, 0,0 specifies the first pixel is in the first row and first column, while 343,492 specifies that the first pixel is in the 344th row and the 493rd column. This location is referenced to the scan direction indicated by the scan code.

f. Resolution: The number of pixels per scanline, set to 1024.

g. Pixel Data: The grayshade of each pixel in the scanline, with 0 indicating missing or no data, and grayshades 1 (black) - 255 (white). Infrared and water vapor images shall be reversed for display of clouds as white.

h. Checksum: See 3.2.4.2.1 .j.

3.2.4.4.4 Raster Scan End of Product Block

The end of product block shall be formatted as shown in Figure 8. The block elements consist of the following:

a. Flag: (2-bits) set to 0 (octal).

b. Length: (14-bits) set to 3 (integer).

C. Mode: (8-bits) set to 1 (octal).

d. Submode: (8-bits) set to 2 (octal).

e. Checksum: set to 177373 (octal).

3.2.5 Communication Protocol

The Communication Protocol used to transmit the DMSP Tactical Weather Terminal products to Local AWDS shall be Transport Control Protocol/Internet Protocol (TCP/IP) as defined in MIL-STD-1777 and MIL-STD-1778TCP/IP. The hardware level protocol shall be ethernet as defined by IEEE 802.3.

DMSP tactical terminals shall transfer the data to directory "/dmsp" on host processor using the Sun Network File System (NFSTM) protocol. The NFSTM protocol is defined in the System and Network Administration, Sun Microsystems, Part Number 800-3805-I 0. The DMSP tactical terminal shall verify space availability for the product before shipment. The filenames shall be awds.msgnn (nn runs 10-99 and rolls over to 10).

AWDS **shall initiate the set-up of the system, acting as the server, and the DMSP terminal shall act as the client. The DMSP terminal shall transfer the PI set product to the remotely mounted mass storage device.**

3.3 Environmental

Not Applicable.

3.4 Safety

Not Applicable.

4.0 QUALITY ASSURANCE PROVISIONS

The verification provisions for the requirements stated herein shall be contained in the specifications for the interfacing elements.

5.0 NOTES

6.0 ACRONYM/ABBREVIATION LIST

The acronyms listed below include all those used in this specification.

AFGWC	Air Force Global Weather Central
AFMC	Air Force Materiels Command
ASCII	American Standard Code for Information Interchange
AUI	Auxillary Interface Unit

AWDS	Automated Weather Distribution System
B	Blanking Flag
BI	First Band Index Value
CIDE	Communication Interface for Data Exchange
CSCI	Computer Software Configuration Item
CSMA/CD	Carrier-Sense Multiple Access with Collision Detection Protocol
DoD	Department of Defense
GI	Grid Indicator
ICAO	International Civil Aeronautical Organization
IEEE	Institute of Electrical and Electronic Engineers
IP	Internet Protocol
IR	Infrared
IRS	Interface Requirements Specification
IS	Interface Specification
LC	Low Cloud
NFSTM	Network File Systems
NOTAM	Notice To Airmen
PI	Projection Indicator
PID	Product Identifier
R	Reverse Video Flag
RDS	Real Time Data Smooth (from DMSP)
RTD	Real Time Data (from DMSP)
SGDB	Satellite Global Data Base
SC	Snow Cloud
SMC	Space and Missiles Systems Center
SSM/I	Special Sensor Microwave Imager
s s s	System Segment Specification
STT	Small Tactical Terminal
SWO	Staff Weather Officer
TCP	Transport Control Protocol
TCP/IP	Transport Control Protocol/Internet Protocol
UGDF	Uniform Gridded Data Field
VIS	Visible
WV	Water Vapor

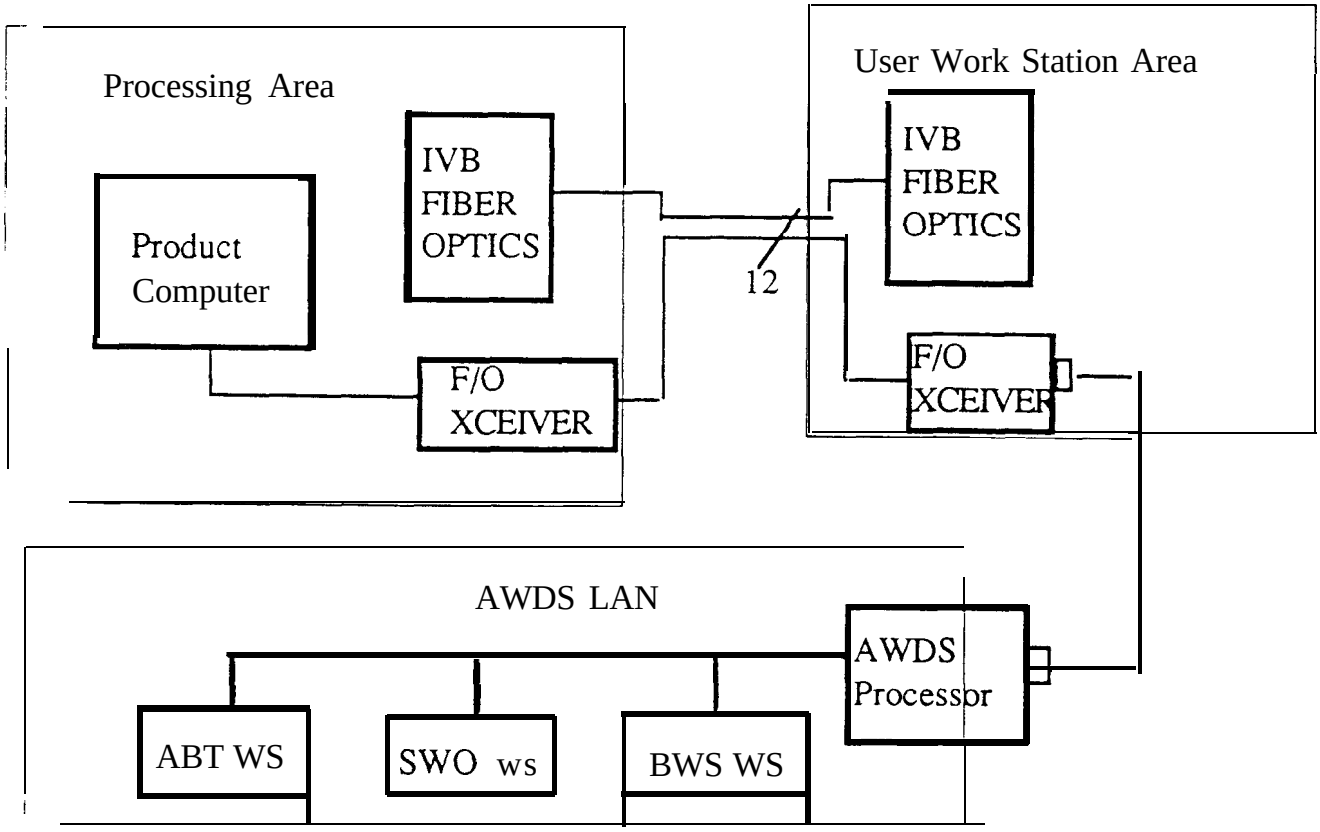


Figure 1. AWDS-Mark IVB interface

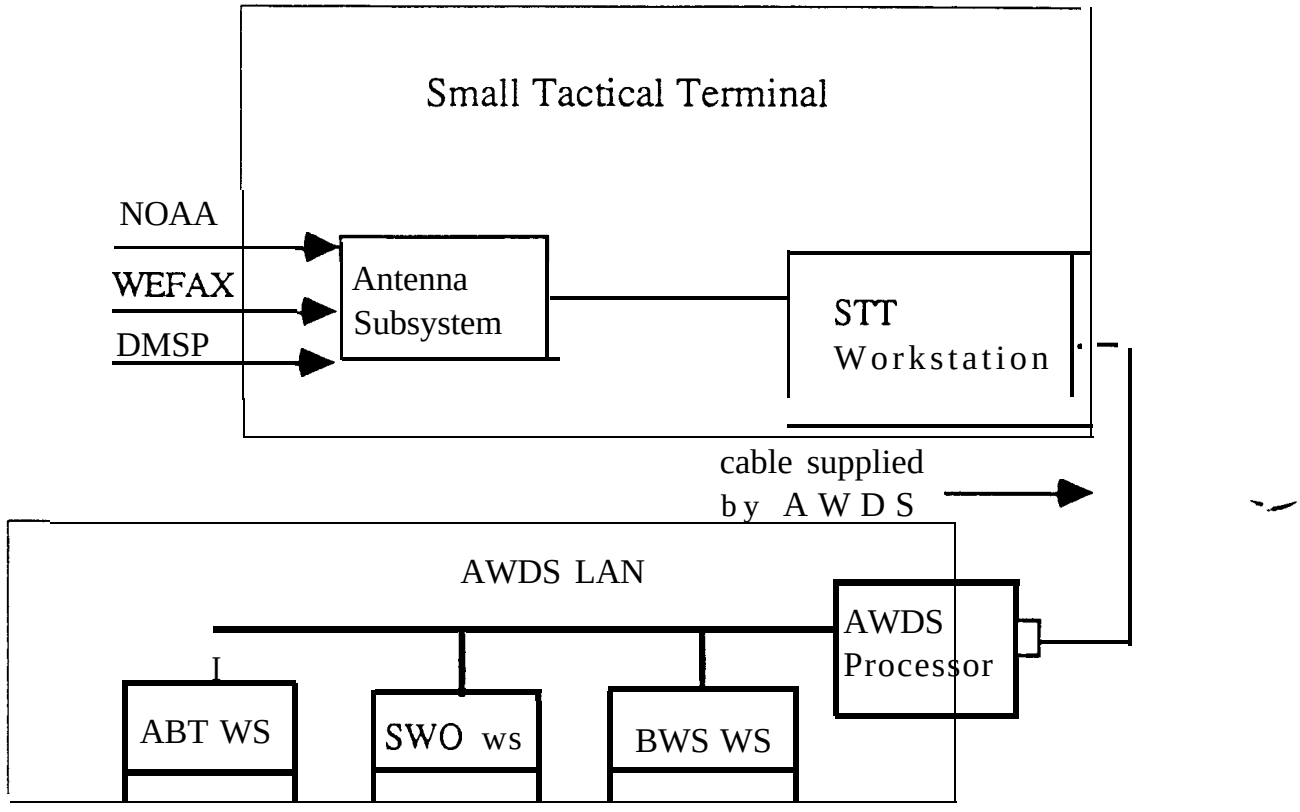


Figure 2. AWDS -Small Tactical Terminal Interface

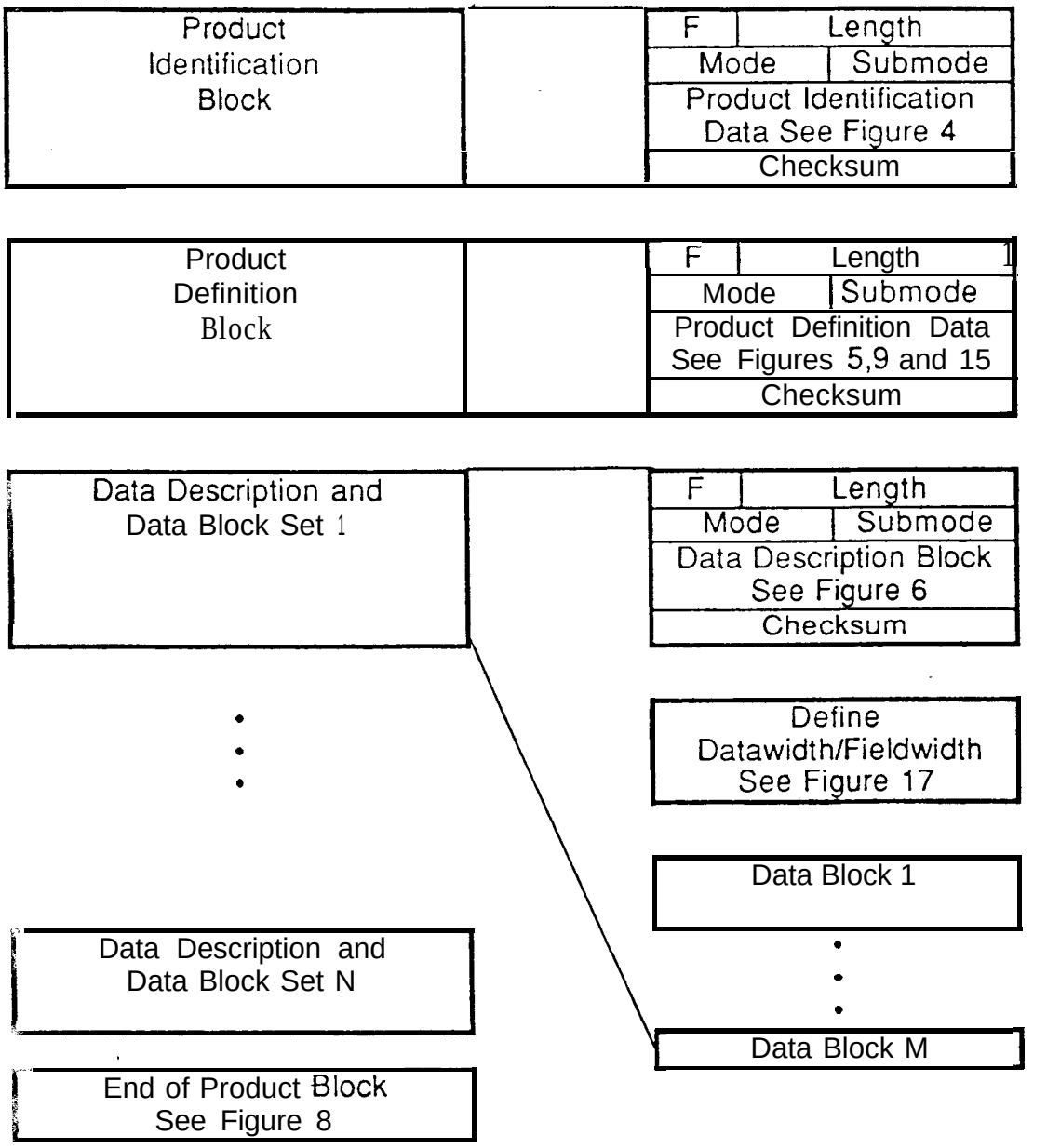


Figure 3. General Structure of Product Data Set

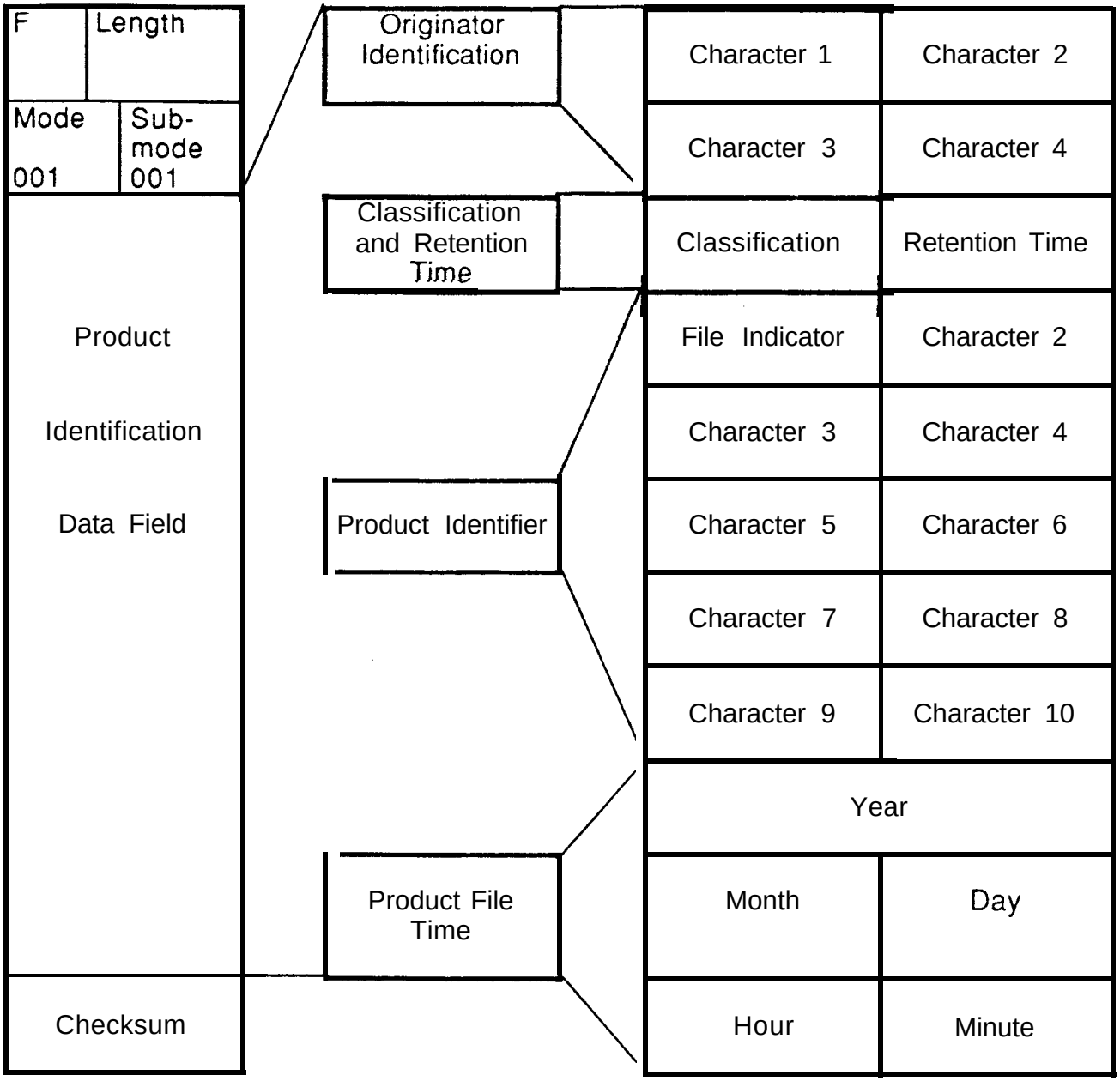
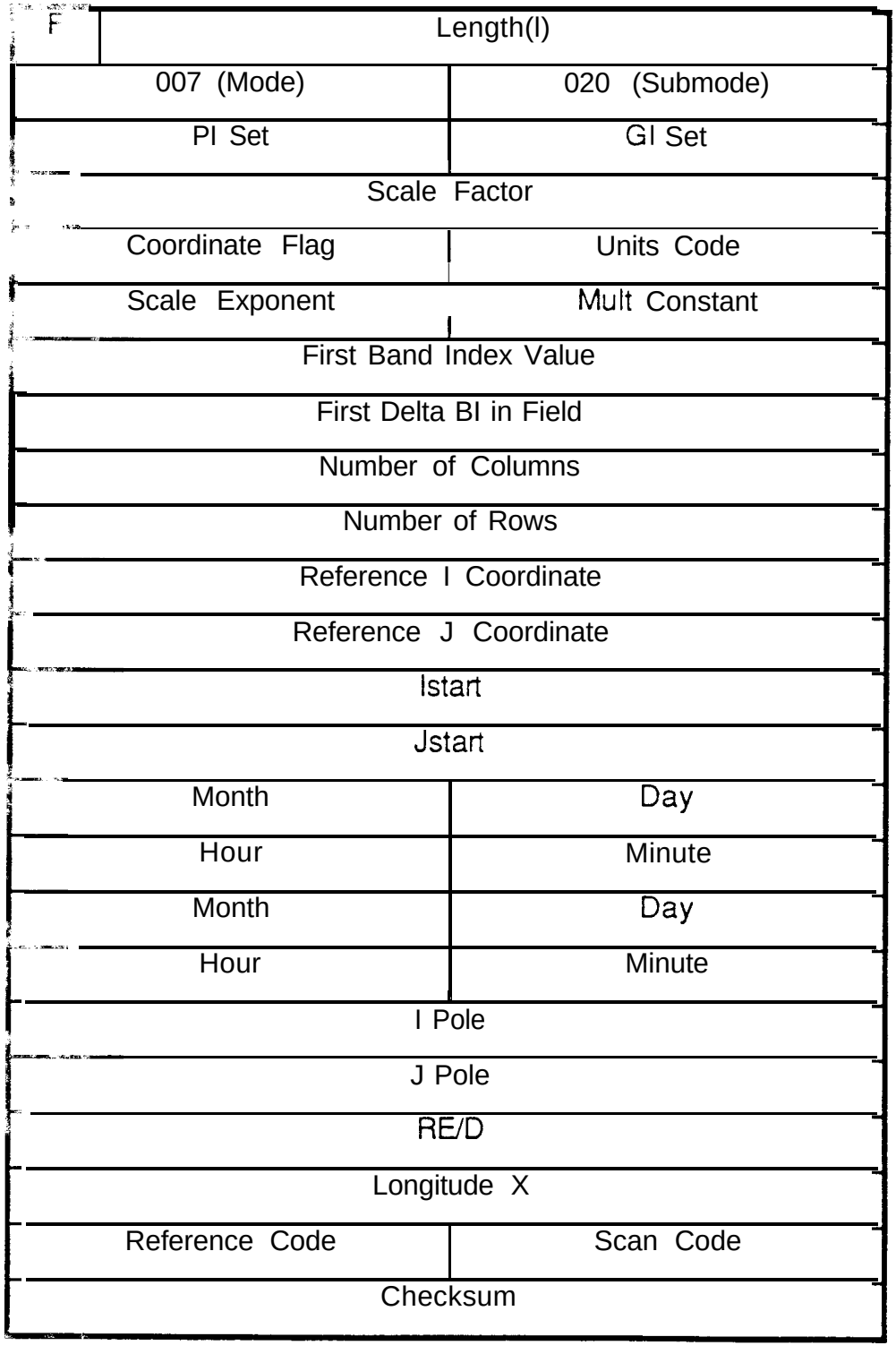


Figure 4. Product Identification Block Format (Mode 1, Submode 1)



Fiaure 5. Gridded Data Product Definition Block

F |	Length(l)
003 (Mode)	021 (Submode)
Elements per Element Set	Bytes per Element Set
Number of Elements	
Mnemonic Character 1	Mnemonic Character 2
Mnemonic Character 3	Mnemonic Character 4
Start Byte of Element	Bytes Occupied per Element
Unused (zero filled)	Units Code
Multiplier Mantissa	Multiplier Characteristic
Additive Constant	
Mnemonic Character 1	Mnemonic Character 2
•	
•	
•	
Additive Constant	
Checksum	

Fiaure 6. Unpacked UGDF Data Description Block

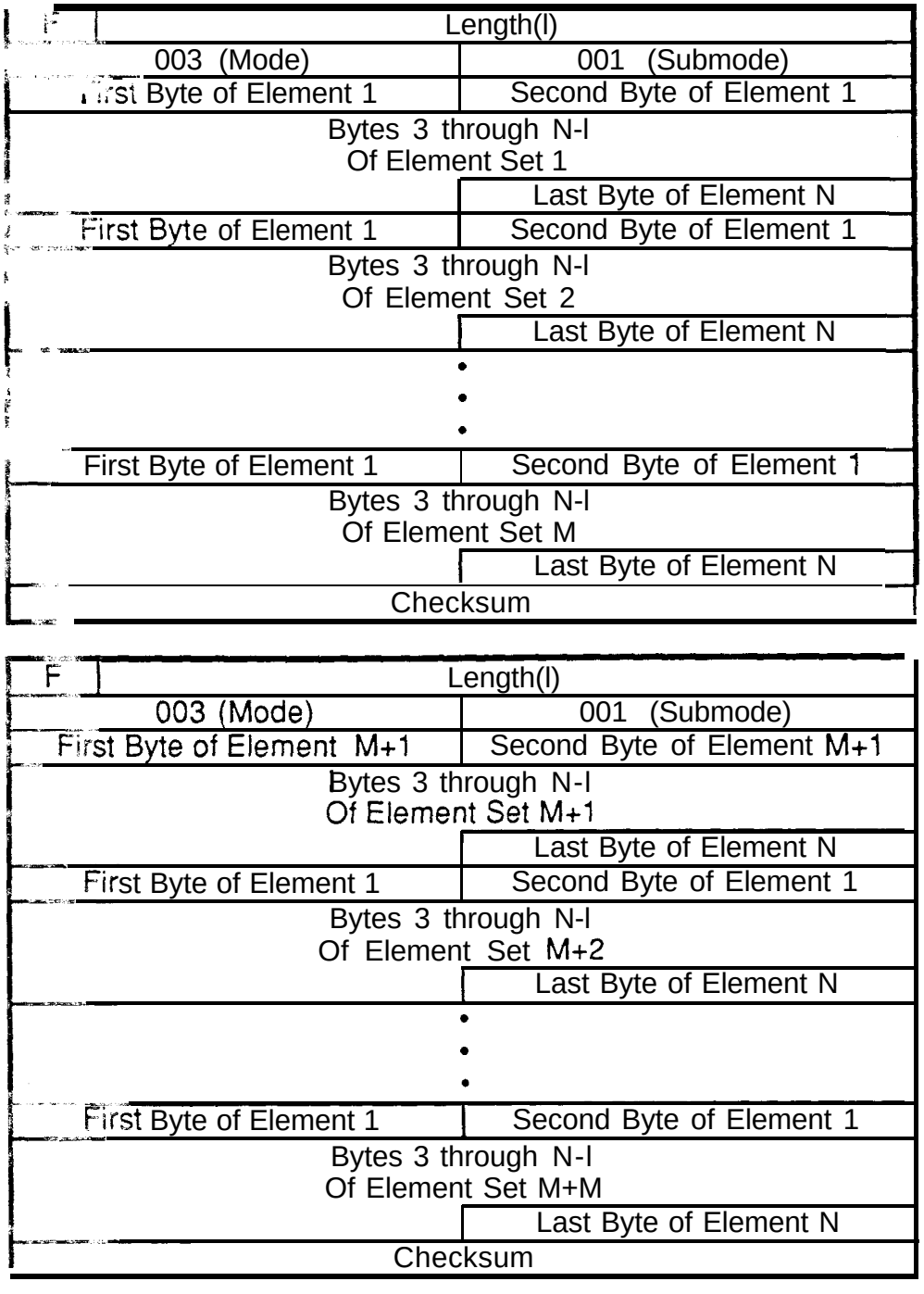


Figure 7. Unpacked UGDF Data Block

F	Length(I)
001 (Mode)	002 (Submode)
Checksum	

Fiaure 8. End of Product Block

F	Length(I)
004 (Mode)	020 (Submode)
PI Set	Coordinate Flag
Scale Factor	
Area Code	Label Code
Reference I Point 1	
Reference J Point 1	
Reference I Point 2	
Reference J Point 2	
Reference I Point 3	
Reference J Point 3	
Month	Day
Hour	Minute
Month	Day
Hour	Minute
Checksum	

Fiaure 9. Vector Graphic Product Definition Block

F	Length(I)
001 (Mode)	004 (Submode)
Zoom Threshold	Zoom Factor
Plot Color	Background Color
Line Character	Line Width
Char 1	Char 2
Char 3	Char 4
Checksum	

Figure 10. Plot Definition Block

F	Length (I)
004 (Mode)	001 (Submode)
Starting I Coordinate	
Starting J Coordinate	
I Coordinate (1)	
B	J Coordinate (1)
I Coordinate (2)	
B	J Coordinate (2)
•	
•	
•	
I Coordinate (N)	
B	J Coordinate (N)
Checksum	

NOTES:

1. I, J COORDINATES - Succesive coordinates which form the line starting at the first set of coordinate values. These values will be in the Logical Display Reference Indices.

2. Beam Flag - This flag is contained in the most significant bit of the J coordinate. If B=0 no line is drawn between coordinate pairs. If B=1, a line is drawn.

Figure 11. Absolute Vectors Block

F	Length(I)	
005 (Mode)		001 (Submode)
I Coordinate		
J Coordinate		
Delta I		Delta J
B	R Char Size	Character 1
Character 2		Character 3
Character 4		Character 5
•		•
•		•
•		•
Character N-1		Character N
Checksum		

Note - the last alphanumeric block will contain product title information to be displayed to the user on the AWDS terminal.

The title should be displayed at the bottom of the display (I Coordinate= 0 , J Coordinate= 0)

Figure 13. Alphanumeric Character Block

F	Length(l)
005 (Mode)	002 (Submode)
BR Character Size	Plot Process Code
I Coordinate 1	
J Coordinate 1	
Character 1	Character 2
Character 3	Character 4
•	•
•	•
•	
Character N-I	Character N
.	
.	
.	
I Coordinate M	
J Coordinate M	
Character 1	Character 2
•	•
•	•
•	
Character N-I	Character N
Checksum	

Figure 13. Plot Data Block

F	Length(l)
005 (Mode)	003 (Submode)
Shaft Length	Blanking Flag
I Coordinate (Barb 1)	
J Coordinate (Barb 1)	
Direction (Barb 1)	
Speed (Barb 1)	
Gust (Barb 1)	Hemisphere (Barb 1)
•	
•	
•	
I Coordinate (Barb N)	
J Coordinate (Barb N)	
Direction (Barb N)	
Speed (Barb N)	
Gust (Barb N)	Hemisphere (Barb N)
Checksum	

Fiaure 14. Wind Barb Data Block (optional)

F	Length(I)
006 (Mode)	020 (Submode)
PI Set	GI set
Satellite Identification	
Longitude X	
Resolution Code	Data Type
I Max	
J Max	
Enhance Max	Enhance Min
Enhance ID	Length (MM)
I Center	J Center
Latitude	
Longitude	
No. of Char	Character 1
Character 2	Character 3
•	
•	
•	
Character N-I	Character N
Checksum	

Figure 15. Satellite Product Definition Block

F	Length(I)
006	030
PI set	Matrix Code
Scan Code	Pack Code
Checksum	

Figure 16. Pixel Product Definition Block

F	Length (I)
001 (Mode)	005 (Submode)
Fieldwidth	Datawidth
Mode	Submode
Checksum	

Figure 17. Define Datawidth/Fieldwidth Block

F	Length (I)
006 (Mode)	001 (Submode)
Starting Row (IROW)	
Starting Column (ICOL)	
Resolution	
Pixel Data	
Checksum	

Figure 18. Raster Scan Data Block

Table I. Coverage Area Identifiers for Tactical Products

PI Set Code	Geographical Designation	Geogra-phical Design-ator	Long X	ILL,JLL	Region Legends
20	Regional Window Europe	EN	100E	53,25	EUROPE
21	Regional Window S.W. Asia	AW	100E	53,29	S.W.ASIA
22	Regional Window S.E. Asia	MO	100E	37,9	S.E. ASIA
23	Regional Window N.W. Asia	OH	100E	37,25	N.W. ASIA
24	Regional Window S. Africa	ZA	170W	41,33	S.AFRICA
25	Reginal Window S. America	AG	100E	33,25	S. AMER
26	Regional Window E. Africa	EA	MER	1,21	E.AFRICA
27	Regional Window Indian Ocean	IO	MER	17,21	INDIAN O
28	Regional Window S.E. Asia	NG	MER	33,21	S.E. ASIA
29	Regional Window Caribbean	DO	MER	76,21	CARIB
31	Regional Window Caribbean	CA	MER	69,19	CARIB CARRIB
32	Regional Window Tropical Hawaiian Islands	TR	MER	47,19	TROP HAWAII
33	Regional Window Marianas	MY	MER	31,19	MARIANAS
34	Regional Window S.E. Asia	ID	MER	25,19	S.E. ASIA
35	Regional Window W. Indian Ocean	MV	MER	10,22	W. INDIAN OCEAN
36	Regional Window Australia	AU	MER	29,28	AUSTRALIA
37	Regional Window W. Africa	AO	MER	2,20	W. AFRICA
38	Regional Window S. Ameria	CH	100E	31,27	S. AMER
39	Regional Window Russia	RA	100E	46,17	RUSSIA
40	Regional Window CONUS	US	80W	21,55	CONUS
41	Regional Window East US	UE	80W	25,57	E. US
42	Regional Window West US	UW	80W	17,57	W. U.S. W. US

Table I. Coverage Area Identifiers for Tactical Products (continued)

PI Set Code	Geographical Designation	Geographical Designator	Long X	ILL,JLL	Region Legends
43	Regional Window North US	UN	80W	17,49	N. U.S. N. US
44	Regional Window Canada	**CN**	80W	25,49	CANADA
45	Regional Window Europe	EU	10E	52,39	EUROPE
46	Regional Window East Asia	JN	100E	33,12	E. ASIA
47	Regional Window Alaska	AQ	170W	18,27	ALASKA
48	Regional Window Hawaii	PA	170W	7,31	HAWAII
49	Regional Window Azores	AZ	10E	49,50	AZORES
50	Regional Window Antarctica	AA	100E	25,41	ANTARCTICA
51	Regional Window Mideast	ME	10E	58,29	MIDEAST
52	Regional Window S. Africa	AP	170W	43,34	S. AFRICA
53	Regional Window New Zealand	NZ	10E	27,45	NEW ZEAL
54	Regional Window Central Atlantic	AI	MER	81,20	CEN ATL
55	Regional Window East Pacifica	MX	MER	59,20	EAST PAC
60	Tropical Cont Ocean-Indian Ocean	IO	MER	9,27	IND OCEAN TROP/IN O
61	Tropical Cont Ocean-West Pacific	PW	MER	31,27	W. PAC TROP/W PA TROP W PAC
62	Tropical Cont Ocean-East Pacific	PZ	MER	53,27	E. PAC TROP/E PA TROP E PAC
63	Tropical Cont Ocean-W. Hemisphere	SA	MER	63,27	TROP WH TROP/W HE S. AM
64	Tropical Cont Ocean-Atlantic	ST	MER	73,27	TROP ATLC TROP/ATLA TROP WH

Table I. Coverage Area Identifiers for Tactical Products (continued)

PI Set Code	Geographical Designation	Geog ra-phical Design-ator	Long X	ILL,JLL	Region Legends
65	Tropical Cont Ocean-Africa	AF	MER	90,27	TROP AFRICA TROP/AFRI TROP AF-ME
66	Tropical Cont Ocean-S. America	BO	MER	91,27	S. AMER
67	Tropical Cont Ocean-Hawaii	PS	MER	43,27	HAWAII
68	Tropical Cont Oceahndonesia	MS	MER	19,27	INDONESIA
69	Tropical Cont Ocean-Central Africa	AM	MER	91,27	CEN AFR
10	Subwindow US (N.W.)	UM	80W	21,47	NW US
71	Subwindow US(West)	UA	80W	[illegible]	U.S.WEST
72	Subwindow US(Mountain)	UC	80W	22,50	U.S. MTN MTN US
73	Subwindow US(S.W)	UX	80W	22,53	U.S.S.W.
74	Subwindow US(N. Central)	UD	80W	25,50	N CNT US
75	Subwindow US (S. Central)	UL	80W	25,53	S CNT US
76	Subwindow US (East)	u o	80W	28,52	E. CONUS E US
77	Subwindow US (N.E.)	UP	80W	31,51	N.E. CONUS
78	Subwindow US (S.E.)	UF	80W	28,55	S.E. CONUS
79	Subwindow US (N.E. Pacific)	UB	80W	18,45	N.E. PACIFIC
80	Subwindow Western Europe	UK	10E	48,38	W. EUR
81	Subwindow Iceland	IL	10E	44,40	ICELAND
82	Subwindow Spain	SP	10E	51,40	SPAIN
83	Subwindow Italy	IY	10E	51,36	ITALY
84	Subwindow Turkey	TU	10E	51,31	TURKEY
85	Subwindow Russia	RS	10E	45,32	RUSSIA
86	Subwindow Afgan/Iran	AH	10E	48,23	IRAN

Table I. Coverage Area Identifiers for Tactical Products (continued)

PI Set Code	Geographical Designation	Geogra-phical Design-ator	Long X	ILL,JLL	Region Legends
87	Subwindow Syria/Iraq	SY	10E	51,29	SYRIA
88	Subwindow Saudi Arabia	SD	10E	54,24	SAUDI
89	Subwindow Egypt	EG	10E	57,30	EGYPT
90	Subwindow Alaska	AK	170W	22,31	ALASKA
91	Subwindow Alaska (Arctic Ocean)	AC	170W	26,27	ARTIC OC
92	Subwindow Alaska (N.W. Canada)	AY	170W	26,35	N.W.CAN
93	Subwindow Alaska (Gulf of Alaska)	GA	170W	18,35	G.OF ALAS
94	Subwindow Alaska (Bering Sea)	LU	170W	18,27	BERING
95	Subwindow Ethiopia	ET	10E	61,23	ETHIOPIA
100	Subwindow Hawaii	HW	170W	7,34	HAWAII
101	Subwindow Hawaii (N.W.)	HF	170W	16,31	N.W. HAWAII
102	Subwindow Hawaii (N.E.)	HG	170W	16,39	N.E. HAWAII
103	Subwindow Hawaii (E)	HH	170W	7,39	E. HAWAII
104	Subwindow Hawaii (W)	HI	170W	7,31	W. HAWAII
110	Subwindow Korea	KO	100E	30,15	KOREA
111	Subwindow Japan	JP	100E	27,17	JAPAN
112	Subwindow Okinawa	EC	100E	28,12	OKINAWA
113	Subwindow Asia (Eastern USSR)	MK	100E	33,20	E. USSR
114	Subwindow Asia (N.W. Pacific)	JH	100E	25,20	N.W.PAC
115	Subwindow Asia (W. Central Pacific)	JK	100E	25,12	W CEN PAC
116	Subwindow Asia (China)	CI	100E	33,12	CHINA
120	Subwindow Lajes	LJ	10E	47,46	LAJES
121	Subwindow Lajes (N.W. Atlantic)	NF	10E	41,50	N.W. ATL
122	Subwindow Lajes (Iceland/Greenland)	GL	10E	41,42	ICELAND
123	Subwindow Lajes N.E. Atlantic	PO	10E	49,42	N.E. ATL
124	Subwindow Lajes (N.Central Atalntic)	AX	10E	49,50	N. CEN ATL
130	Subwindow Panama	PM	MER	72,14	PANAMA

Table I. Coverage Area Identifiers for Tactical Products (continued)

PI Set Code	Geographical Designation	Geogra-phical Design-ator	Long X	ILL,JLL	Region Legends
131	Subwindow Gulf of Mexico	CX	MER	70,12	GULF MEX
132	Subwindow Tropical Hawaii	HT	MER	51,13	HAWAII
133	Subwindow Guam	GM	MER	35,14	GUAM
134	Subwindow South China Sea	SS	MER	27,14	S CHINA S
135	Subwindow Philippine Sea	PH	MER	32,11	PHIL SEA
136	Subwindow S. Hemisphere	FK	170W	32,16	S. Hemi
137	Subwindow S.Hemisphere		10E	40,24	S. Hemi
138	Subwindow S. Hemisphere		80W	40,16	S. Hemi
139	Subwindow S. Hemisphere		100E	32,24	S. Hemi
0	Non PI Set Image				-

Table II. Indicators for Tactical Products

CODE VALUE	1ST I BASE TIME (NOTE 2)	2ND I LEVEL	1ST E PARAMETER	2ND E FORECAST HOURS
0	00Z	1000 mb	Lightning	0
1	03Z	100 mb	Potential Temperature	3
2	06Z	200 mb	Dew Pt Temperature	6
3	09Z	300 mb	Ceiling	9
4	12Z	400 mb	Visibility	12
5	15Z	500 mb	Icing Parameters	15
6	18Z	600 mb	Humidity Parameters	18
7	21Z	700 mb	Rain accumulation	21
8	00Z	850 mb	Cloud Parameters	30
9	03Z	N/A	Multiple Parameters	36
A	06Z	250 mb	Total Cloud Amount	24
B	09Z	150 mb	Cloud Base	48
C	12Z	50 mb	Cloud Top	72
D	15Z	Tropopause	D-Value	4 Days
E	18Z	70 mb	Equivalent Potential Temperature	5 Days
F	21Z	30 mb	Stream Function	6 Days
G	00Z	20 mb	Geopotential Height	7 Days
H	03Z	10 mb	High Cloud Amount	8 Days
I	06Z	Low	Divergence	9 Days
J	09Z	Middle	Vorticity	10 Days
K	12Z	High	Streamlines	60 Hours
L	15Z	925 mb	Low Cloud Amount	1 Hour

Table II. Indicators for Tactical Products (Continued)

CODE VALUE	1ST I BASE TIME	2ND I LEVEL	1ST E PARAMETER	2ND E FORECAST HOURS
M	18Z	950 mb	Middle Cloud Amount	2 Hours
N	21Z	990 mb	Dewpoint Depression	4 Hours
O	00Z	Above Bndry Layer	Omega	5 Hours
P	03Z	Sea Surface	Pressure	7 Hours
Q	06Z	Soil	Quantitative Precipitation Forecast	8 Hours
R	09Z	1600 m AGL	Boundary Layer Dewpoint Depression	10 Hours
S	12Z	surface	SWEAT	11 Hours
T		Multi-Level Thunderstorms	Temperature	
U	18Z	Multi-Level Clouds and Weather	U-Component of Wind	
V	21Z	Multi-Level Turbulence	V-Component of Wind	
W	01Z	Multi-Level Winds and Jet	Precipitable Water	
X	02Z	Multi-Level Surface Features	Primary Present Weather	
Y	04Z	Multi-Level Weather	Secondary Present Weather	
Z	05Z	Multi-Level Unspecified	Tertiary Present Weather	
a	07Z	Thickness (1000-850)	Altimeter Setting	

Table II. Indicators for Tactical Products (Continued)

CODE VALUE	1ST I BASE TIME	2ND I LEVEL	1ST E PARAMETER	2ND E FORECAST HOURS
b	08Z	Thickness (1000-700)	Barometric Pressure Tendency	
c	10Z	Thickness (1000-500)	Thickness (see note 1)	
d	11Z	Thickness (850-700)	Aerosol Type	
e	13Z	Thickness (850-500)	Boundary Layer Parameters	
f	14Z	Thickness (700-500)	NEXRAD Parameters	
g	16Z	Thickness (500-300)	IR Parameters	
h	17Z	Thickness (300-200)	wind speed	
i	19Z	7 mb	soil moisture	
j	20Z	5 mb	Ice Age	
k	22Z	2 mb	Ice Edge/ Concentration	
l	23Z	1 mb	Age	
m	JAN	0.4 mb	Contrail	
n	FEB	0.1 mb	Turbulence Parameters	
o	MAR	0.03 mb	Precipitation Parameters	
p	APR	level 1	wind parameters	
q	MAY	level 2	snow cover	
r	JUNE	level 3	rain rate	
s	JULY	level 4	snow parameters	
t	AUG	level 5	Thunderstorm Parameters	
u	SEPT	50M AGL	sea parameters	

Table II. Indicators for Tactical Products (Continued)

CODE VALUE	1ST I BASE TIME	2ND I LEVEL	1ST E PARAMETER	2ND E FORECAST HOURS
v	OCT	150M AGL	volcanic ash fall out parameters	
w	NOV	300M AGL	brightness temperature	
x	DEC	600M AGL	reserved	
y		900M AGL	reserved	
z		1200M AGL	reserved	

DMSP TACTICAL TERMINALS AWDS REQUIREMENT
AWDS REQUIREMENT NOT USED BY DMSP TACTICAL TERMINALS
P3I REQUIREMENT FOR DMSP TACTICAL TERMINALS AWDS

note 1 = thickness levels are defined between the i mandatory levels (1000, 850, 700, 500, 400, 300, 250, 200, 150, 100, 70, 50, 30, 20, 10 mb levels) (e.g. if product lists second i code value 0, 1000- 850 mb thickness is sent.)

note 2 = Base Time is the acquisition time (or creation time if acquisition time is not appropriate).

Table III. Tactical UGDF Product Mnemonics and Units Code

Weather Element	Mne-monic	First E	UNITS	UNITS CODE	RANGE OF VALUES
Age	AG	l	hours	61	N/A
Brightness Temperature	TPB	w	°C	2	-200 to 50
Ceiling	CIG	3	FT	12	0 to 50000
Cloud Amount	CA	8	%	24	0 to 100
Cloud Base	CDB	B	M	3	0 to 25000
Cloud Top	CDT	C	M	3	0 to 25000
Cloud Type	CT	8	N/A	23	1 to 10
Cloud Water	CLW	6	KG/M**2	26	0 to 12.5
Dew Point Depression	DPD	N	°C	2	0 to 50
Geopotential Heights	GPH	G	M	3	0 to 50000
Geostrophic Winds	UWC VWC	9	M/S	4	-200 to +200
Ice Age	IAG	j	N/A	23	Null, First, MY
Ice Concentration	ICE	k	%	24	0 to 100
Ice Edge	ICD	k	N/A	23	0 or 1
Liquid Water	LWC	6	KG/M**2	26	0 to 12.5
Rain Rate	RR	r	mm/hr	76	0 to 61
Relative Humidity	RH	6	%	24	0 to 100
Snow Depth	SNO	s	cm	10	0 to 2000
Snow Water	SNW	s	cm	10	0 to 50
Soil Moisture	SIM	i	%	24	0 to 100
Specific Humidty	SH	6	G/KG	75	0 to 50
Temperature	TMP	T	°C	2	-120 to 50
Temperature of Dew Point	DPT	2	°C	2	-100 to 50
Thickness	THK	c	M	3	100 to 5000
Total Cloud Amount	CTA	A	%	24	0 to 100
Total Water	THW	6	G/KG	75	0 to 50
Wind Speed	SPD	h	M/S	4	0 to 200

Note: The Age (time) shall be specified in minutes since OOZ, e.g. if data is valid at 05052, the time shall be coded as 305.

Table IV. Tactical UGDF Products Mathematical Parameters

Mnemonic	Units/Code	Multiplier Mantissa	Multiplier Character	Additive Constant
CA	24	1	0	0
CDB	3	1	2	0
CDT	3	1	2	0
CIG	12	2	2	0
CLW	26	1	0	0
CTA	24	1	0	0
DPD	23	1	0	0
DPT	2	1	1	173
GPH	3	2	2	0
IAG	23	N/A	N/A	N/A
ICD	23	1	0	0
ICE	24	1	0	0
LWC	26	5	-2	0
RH	24	1	0	0
RR	76	1	0	0
SH	75	1	0	0
SIM	24	1	0	0
SNO	10	1	1	0
SNW	10	1	0	0
SPD	4	1	0	0
TKK	3	2	1	100
TKW	75	1	0	0
TIM	61	1	0	0
TMP	2	1	0	150
TPB	2	2	0	0
u w c	4	2	0	200
v w c	4	2	0	200

Table V. Symbols for Vector Graphic Mnemonics

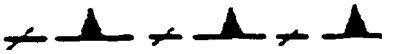
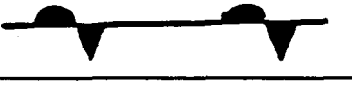
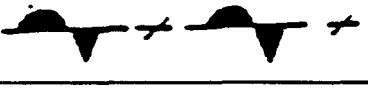
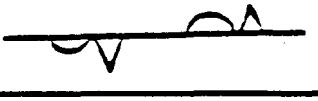
Description	VG Mnemonic	Default Color	Graphic Representation
Cold Front Aloft	CFA	Blue	
Cold Front Surface	CFS	Blue	
Cold Frontogenesis	CFG	Blue	
Cold Frontolysis	CFX	Blue	
Occluded Front Aloft	OFA	Note 2	
Occluded Front Surface	OFS	Note 2	
Occluded Frontolysis	OFX	Note 2	
Stationary Front Aloft	SFA	Red + Blue	
Stationary Front Surface	SFS	Red + Blue	
Stationary Frontogenesis	SFG	Red + Blue	
Stationary Frontolysis	SFX	Red + Blue	
Stationary Occluded Front Aloft	SOA	Red + Blue	

Table V. Symbols for Vector Graphic Mnemonics
(Continued)

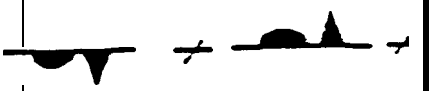
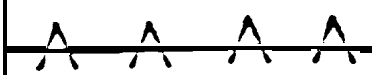
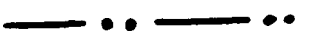
Description	VG Mnemonic	Default Color	Graphic Representation
Stationary Occluded Front Surface	SOS	Red+ Blue	
Stationary Occluded Frontolysis	s o x	Red + Blue	
Warm Front Aloft	WFA	Red	
Warm Front Surface	WFS	Red	
Warm Frontogenesis	WFG	Red	
Warm Frontolysis	WFX	R e d	
Axis of Advection	AOA	White	
Dry Line	DRY	Note 3	
Horizontal Speed Shear	HSS	Blue	
Positive Vorticity Advection Line	FVA	White	
Ridge Axis	RDG	Blue	
Shear/Instability Line	INS	White	

Table V. Symbols for Vector Graphic Mnemonics
(Continued)

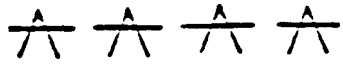
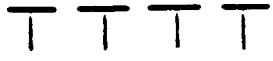
Description	VG Mnemonic	Default Color	Graphic Representation
Temperature Ridge 700 mb	TR7	Note 3	
Trough Axis	TRO	White	
Anticyclonic Wind Shear Zone	ACZ	White	
Auxilliary Upper Level Contour	AUX	White	
Ceiling less than 10,000 ft area outline	D10	Note 2	
Ceiling less than 1000 f-t and/or visibility less than 1 mile area outline	B11	Red	
Ceiling less than 3000 ft and/or visibility less than 3 miles area outline	c33	Blue	
Clear Air Turbulence area outline	CAT	Blue	
Convergence Area Outline	CVG	Red	
Height fall area outline 12/24 hr	HTF	Blue	
Icing Area Outline	ICG	Note 2	
Less than 2/8 cloud cover area outline	LES	White	

Table V. Symbols for Vector Graphic Mnemonics
(Continued)

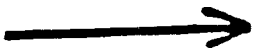
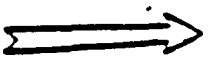
Description	VG Mnemonic	Default Color	Graphic Representation
Non-Convective or Intermittent precipitation area outline	CFA	Blue	
Streamline	STM	White	
Thunderstorm or Convective area outline	CVA	Red	
Arrowhead Style 1	AH1	White	
Arrowhead Style 2	AH2	White	
Arrowhead Style 3	AH3	White	
Arrowhead Style 4	AH4	White	
Arrowhead Style 5	AH5	White	
Arrowhead Style 6	AH6	White	
Solid Line 1	SL1	Red	
Solid Line 2	SL2	Blue	
Solid Line 3	SL3	White	

Table V. Symbols for Vector Graphic Mnemonics
(Continued)

Description	VG Mnemonic	Default Color	Graphic Representation
Solid Line 4	SL4	Green	
Solid Line 5	SL5	Note 2	
Solid Line 6	SL6	Note 3	
Solid Line 7	SL7	Note 4	
Dashed Line 1	DL1	Red	
Dashed Line 2	DL2	Blue	
Dashed Line 3	DL3	White	
Dashed Line 4	DL4	Green	
Dashed Line 5	DL5	Note 2	
Dashed Line 6	DL6	Note 3	
Dashed Line 7	DL7	Note 4	

Table V. Symbols for Vector Graphic Mnemonics
(Continued)

Description	VG Mnemonic	WMO Code	Graphic Representation
No Reportable Weather		000	No symbol
Smoke	K	004 Note 1	
Haze	H	005 Note 1	
Dust/Sand	D	006 Note 1	
Blowing Dust/Sand	BD	007 Note 1	
Dust Devil	DD	008 Note 1	
Lightning Visible	LTG	013 Red	
Thunderstorm	T	017 Red	
Squalls	SQL	018 Red	
Funnel Cloud	FNL	019 Red	
Drizzle during past hour	LPH	020 Green	
Rain during past hour	RPH	021 Green	

Table V. Symbols for Vector Graphic Mnemonics
(Continued)

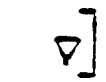
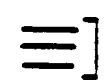
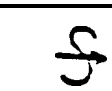
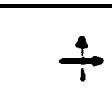
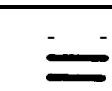
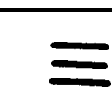
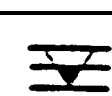
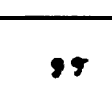
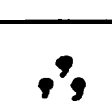
Description	VG Mnemonic	WMO Code	Graphic Representation
Snow during past hour	SPH	022 Green	
Freezing precipitation dunng past hour	ZPH	024 Red	
Showers during past hour	WPH	025 Green	
Fog during past hour	FPH	028 Note 2	
Thunderstorm during past hour	TPH	029 Red	
Dust Storm/Sandstorm	BDS	031 Note 1	
Blowing Snow	BS	038 Green	
Ground fog	GF	044 Note 2	
=og	F	045 Note 2	
Ice Fog	IF	049 Note 2	
Drizzle, light	L-	051 Green	
Drizzle, moderate	L	053 Green	

Table V. Symbols for Vector Graphic Mnemonics (Continued)

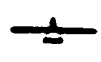
Description	VG Mnemonic	WMO Code	Graphic Representation
Drizzle, heavy	L+	055 Green	
Freezing Drizzle	ZL	056 Red	
Rain, light	R-	061 Green	
Rain, moderate	R	063 Green	
Rain, heavy	R+	065 Green	
Freezing rain	ZR	066 Red	
Rain and Snow mixed	RS	068 Green	
Snow, Light	S-	071 Green	
Snow, moderate	S	073 Green	
Snow, heavy	s+	075 Green	
Ice Prisms	IPZ	076 Red	
Snow Grains	SG	077 Green	

Table V. Symbols for Vector Graphic Mnemonics
(Continued)

Description	VG Mnemonic	WMO Code	Graphic Representation
Ice Pellets	IP	079 Red	
Rain Showers	RW	080 Green	
Showers of Rain/Snow mixed	RSW	083 Green	
Snow Shower	SW	085 Green	
Ice Pellet Shower	IPW	087 Red	
Hail Shower	A	089 Red	
Thunderstorm with rain shower	TRW	093 Red	
Thunderstorm with snow shower	TSW	094 Red	
Thunderstorm with Rain and snow mixed	TRS	095 Red	
Thunderstorm with hail	TA	096 Red	
Past Weather - Blowing Dust or snow	PWB	103 Note 1	
Past Weather - Fog	PWF	104 Note 2	

Table V. Symbols for Vector Graphic Mnemonics
(Continued)

Description	VG Mnemonic	WMO Code	Graphic Representation
Past Weather - Drizzle	PWL	105 Green	
Past Weather - Rain	PWR	106 Green	
Past Weather - Snow	PWS	107 Green	
Past Weather - Showers	PWW	108 Green	
Past Weather - Thunderstorm	PWT	109 Red	
Cumulus Cloud Type	c u	111 White	
Towering Cumulus	TCU	112 White	
Cumulonimbus without anvil	CB3	113 Red	
Stratocumulus	SC	114 White	
Stratus	ST	116 White	
Cumulonimbus with anvil	CB9	119 Red	
Altostratus	AS	121 White	

Table V. Symbols for Vector Graphic Mnemonics
(Continued)

Description	VG Mnemonic	WMO Code	Graphic Representation
Nimbostratus	NS	122 White	
Altocumulus	AC	123 White	
Altocumulus Standing Lenticular	ACS	124 White	
Altocumulus Castellarus	ACC	128 White	
Cirrus	Cl	131 White	
Cirrostratus	c s	135 White	
Cirrocumulus	c c	139 White	
Missing cloud amount	CAM	149 White	
No clouds (clear)	CA0	150 White	
One Tenth Cloud Amount	CA1	151 White	
Two to Three Tenths Cloud Amount	CA2	152 White	
Four Tenths Cloud Amount	CA3	153 White	

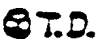
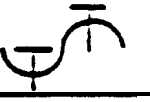
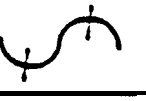
Table V. Symbols for Vector Graphic Mnemonics
(Continued)

Description	VG Mnemonic	WMO Code	Graphic Representation
Five Tenths Cloud Amount	CA4	154 White	
Six Tenths Cloud Amount	CA5	155 White	
Seven to Eight Tenths Cloud Amount	CA6	156 White	
Nine Tenths Cloud Amount	CA7	157 White	
Ten Tenths Cloud Amount	CA8	158 White	
Obscured Cloud Amount	CA9	159 White	
Rising then falling	BCO	160 White	
Rising then Steady	BC1	161 White	
Rising	BC2	162 White	
Fallling or steady, then rising	BC3	163 White	
Steady	BC4	164 White	
Falling then Rising	BC5	165 White	

Table V. Symbols for Vector Graphic Mnemonics
(Continued\

Description	VG Mnemonic	WMO Code	Graphic Representation
Falling then Steady	BC6	166 White	
Falling	BC7	167 White	
Steady or Rising, then falling	BC8	168 White	
Wind Direction Missing	WDM	186 White	
Wind Speed Missing	WSM	188 White	
Anticyclonic Circulation Center	ANC	Blue	
Cyclonic Circulation Center	CYC	Red	
High Pressure/Height Center	HI	Blue	
Low Pressure/Height Center	LO	Red	
Subtropical Depression	SDP	Red	
Subtropical Storm - NH	SSN	Red	
Subtropical Storm - SH	SSS	Red	

Table V. Symbols for Vector Graphic Mnemonics
(Continued)

Description	VG Mnemonic	WMO Code	Graphic Representation
Tropical Cyclone - NH	TCN	Red	
Tropical Cyclone - SH	TCS	Red	
Tropical Depression	TDP	Red	
Tropical Ston - NH	TSN	Red	
Tropical Storm - SH	TSS	Red	
Clear icing, trace	ICT	Note 1	
Clear icing, light	ICL	Note 1	
Clear icing, moderate	ICM	Note 1	
Clear icing, severe	ICS	Note 1	
Mixed icing, trace	IMT	Note 1	
Mixed icing, light	IML	Note 1	
Mixed icing, moderate	IMM	Note 1	

Tabie V. Symbols for Vector Graphic Mnemonics
(Continued)

Description	VG Mnemonic	WMO Code	Graphic Representation
Mixed icing, severe	IMS	Note 1	
Rime icing, trace	IRT	Note 1	
Rime icing, light	IRL	Note 1	
Rime icing, moderate	IRM	Note 1	
Rime icing, severe	IRS	Note 1	
Turbulence, light	TBL	Blue	
Turbulence, moderate	TBM	Blue	
Turbulence, severe	TBS	Blue	
Minus Sign	MNS	White	
Plus Sign	PLS	White	
Triple Point	TRP	White	

Note 1. The normal default color for the display of the symbol is brown.
Note 2. The normal default color for the display of the symbol is yellow.